CLAIMS

What is claimed is:

1. A method of verifying the authenticity of an object comprising:

providing a primary image;

providing a secondary image;

encoding the primary image;

providing a random code;

convolving the encoded primary image with the random code, providing thereby a reference image;

affixing the reference image to the object to be authenticated;

transforming the reference image; and

comparing the transformed reference image with the secondary image.

2. A system for verifying the authenticity of an object comprising:

a signal source;

a first subsystem receiving a first signal from the signal source and providing as output therefrom a first output signal;

a second subsystem receiving a second signal from the signal source and providing as output therefrom a second output signal;

a third subsystem receiving the first and second output signals for comparing the first output signal with the second output signal.

3. The system for verifying the authenticity of an object as set forth in Claim 2 wherein the signal source comprises an optical source.

4. The system for verifying the authenticity of an object as set forth in Claim 2 wherein the first subsystem is an optical subsystem.

5. The system for verifying the authenticity of an object as set forth in Claim 2 wherein the second subsystem is an optical subsystem.

6. The system for verifying the authenticity of an object as set forth in Claim 2 wherein the third subsystem is an optical subsystem.

7. The system for verifying the authenticity of an object as set forth in Claim 3 wherein the optical source is a source of coherent light.

8. The system for verifying the authenticity of an object as set forth in Claim 7 wherein the source of coherent light comprises a laser operative to provide a laser beam to the first and second subsystems.

9. The system for verifying the authenticity of an object as set forth in Claim 4 wherein the first optical subsystem comprises

a beam expander for expanding an optical signal;

a collimating lens for collimating the optical signal;

a secondary image disposed in optical beam;

a first Fourier transform lens disposed in the optical beam;

a spatial filter disposed in the optical beam; and

an imaging subsystem for imaging a complex amplitude distribution onto the detector.

10. The system for verifying the authenticity of an object as set forth in Claim 5 wherein the second optical subsystem comprises

a beam expander for expanding an optical signal;

a collimating lens for collimating the optical signal and illuminating a reference image;

a beam splitter for receiving the collimated optical signal and a reference signal from the reference image; and

a second Fourier transform lens for receiving an optical signal representative of the reference image.

11. The system for verifying the authenticity of an object as set forth in Claim 6 wherein the third optical subsystem comprises

a detector for detecting the first and second output signals; and

a signal comparator for comparing the first and second output signals.

12. The system for verifying the authenticity of an object as set forth in Claim 11 wherein the detector comprises a charge coupled device.

13. The system for verifying the authenticity of an object as set forth in Claim 11 wherein the comparator comprises:

a nonlinear transfer function generator; and

an inverse transformer in signal communication therewith; and

a verifyer.

14. A method of generating a reference image comprising:

providing a primary image;

encoding the primary image;

providing a random code; and

convolving the encoded primary image with the random code, providing thereby the reference image.

15. The method as set forth in Claim 14 wherein providing the primary image includes providing a primary image having a spatial dependence designated by $f(x,y)$.

16. The method as set forth in Claim 14 wherein encoding the primary image includes phase encoding the primary image in accordance with a functional form designated by

$$\exp\{i\pi f(x,y)/\mathrm{Max}[f(x,y)]\}.$$

17. The method as set forth in Claim 14 wherein providing the random code includes providing a random code having a spatial dependence designated by $c(x,y)$.

18. The method as set forth in Claim 14 further comprising setting the amplitude of the reference image to a value of unity.

19. The method as set forth in Claim 14 wherein providing setting the amplitude of the reference image to a value of unity includes dividing the convolved image by the modulus of the convolved image.

20. The system for verifying the authenticity of an object as set forth in Claim 2 wherein the signal source is a electronic source.

21. The system for verifying the authenticity of an object as set forth in Claim 20 wherein the electronic source is a discrete electronic source.